

No. 681,108.

J. T. COWLEY.

Patented Aug. 20, 1901.

PNEUMATIC DESPATCH TUBE APPARATUS.

(Application filed Dec. 21, 1899.)

(No Model.)

3 Sheets—Sheet 1.

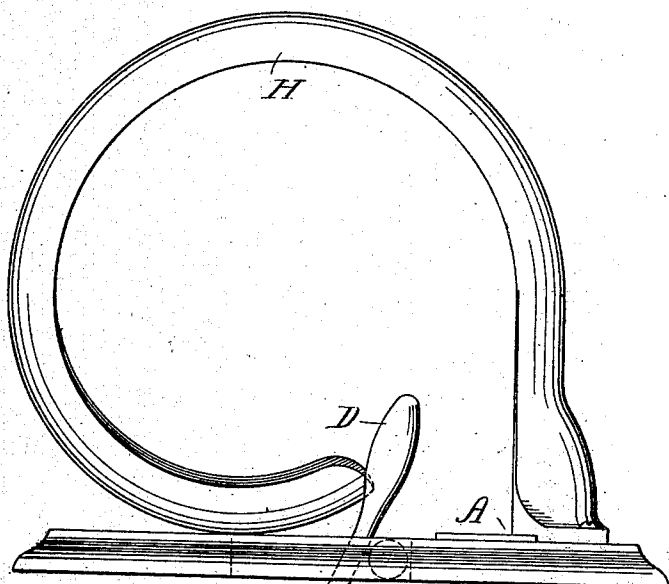


Fig. 1.

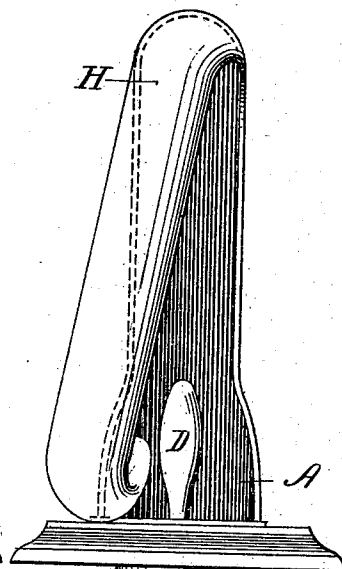


Fig. 2.

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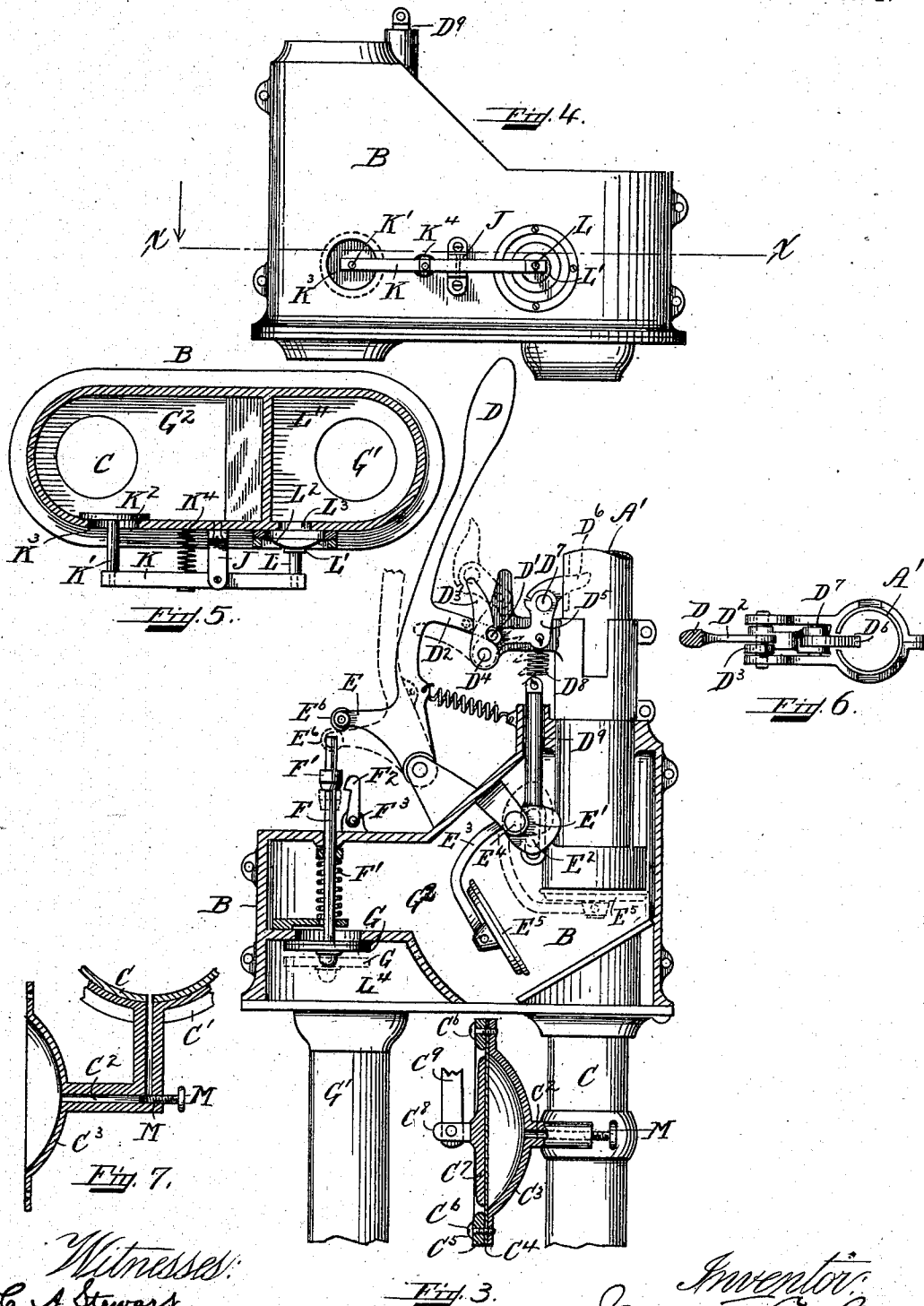


Fig. 5.

Fig. 6.

Fig. 7.

Fig. 3.

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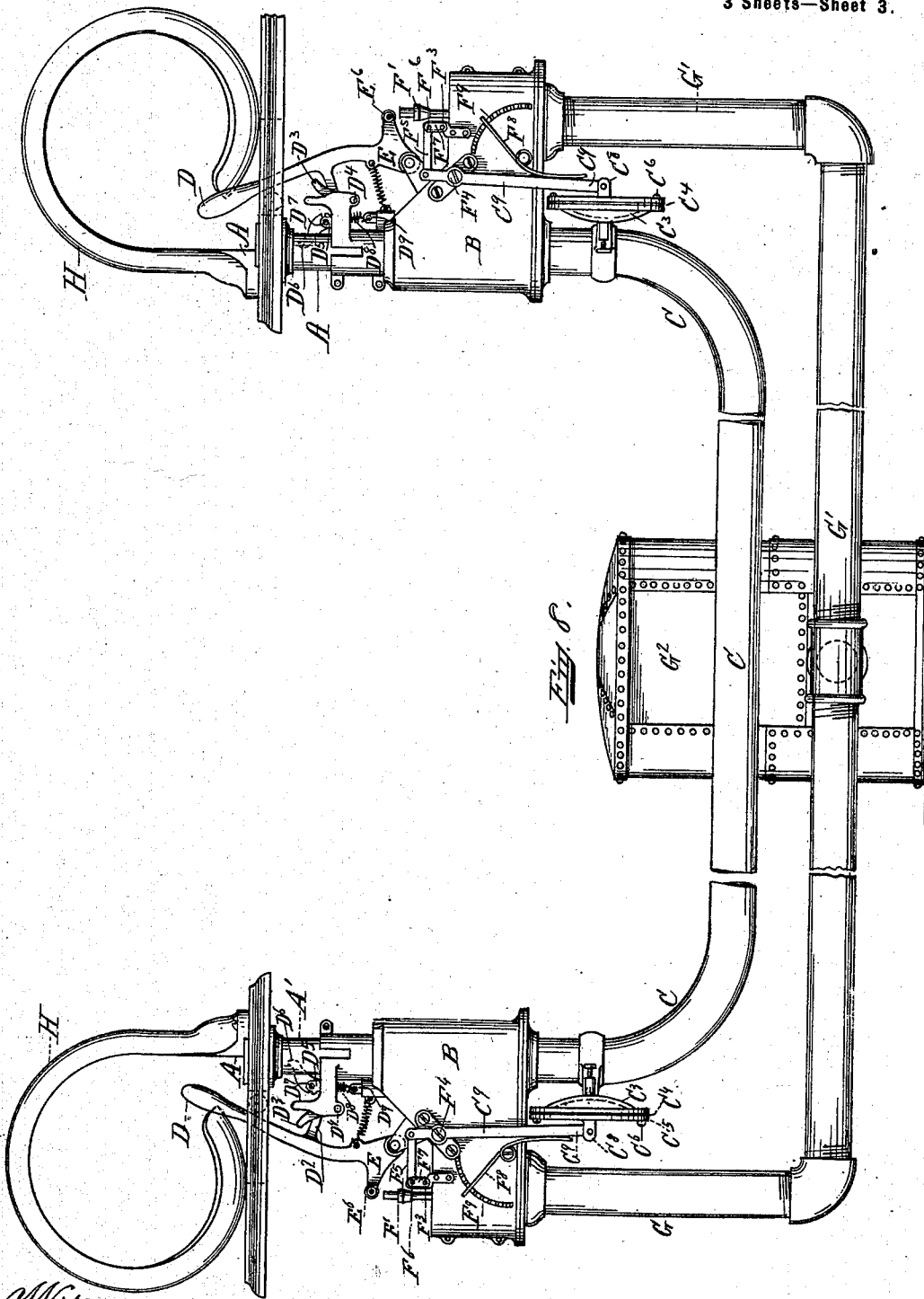
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UNITED STATES PATENT OFFICE.

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PNEUMATIC-DESPATCH-TUBE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 681,108, dated August 20, 1901.

Application filed December 21, 1899. Serial No. 741,112. (No model.)

To all whom it may concern:

Be it known that I, JAMES T. COWLEY, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Pneumatic-Despatch-Tube Apparatus, of which the following is a specification.

My invention relates to improvements in pneumatic-despatch-tube apparatus in which the carriers are propelled by air-pressure through a single tube in both directions and in which the air-pressure which drives the carrier is cut off when the carrier is delivered at one of the terminals, and is an improvement on the despatch apparatus shown, described, and claimed in United States Letters Patent No. 640,020, dated December 26, 1899, and issued to the Lamson Consolidated Store Service Company, of New Jersey, as the assignee of Albert W. Pearsall.

My invention consists of certain novel features hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, which illustrate a construction embodying my invention, Figure 1 is a side elevation of the terminal. Fig. 2 is a front elevation of the same. Fig. 3 is a side elevation of a portion of the terminal with parts in section. Fig. 4 is a side elevation of the valve-box, taken on the opposite side of Fig. 1. Fig. 5 is a sectional view taken on the line X X, Fig. 4. Fig. 6 is a top plan view of a portion of Fig. 3. Fig. 7 is a detail sectional view of the passage leading to the diaphragm. Fig. 8 is a side elevation of the line, showing the terminal at each end of the line.

Like letters of reference refer to like parts throughout the several views.

To despatch a carrier, it is dropped into the mouth A of the tube A' and passes down through the valve-box B into the transmission-tube C. Then the lever D is pulled toward the left, (shown partly in dotted lines, Fig. 3,) and the arm E of said lever pushes down the valve-rod F against the tension of the spring F' and opens the valve G and allows the compressed air to flow in from the pipe G' by the valve G and through the chamber G² into the transmission-tube C. The movement of the lever D to

the left, as above described, carries with it the pin D' on the arm D², and this pin, acting against the cam-surface of the lever D³, secured to the shaft D⁴, moves the lever D³ to the position shown in dotted lines, Fig. 3. Secured also on the shaft D⁴ is the arm D⁵, having at its outer end the loose dog D⁶, pivoted on the arm D⁵ at D⁷ and projecting into the transmission-tube A' and held by a suitable spring in the position shown in Fig. 3.

Secured to the arm D⁵ is a spring D⁸, the opposite end of which is secured to the rod D⁹, which passes downwardly within the valve-box B. The lower end of this rod D⁹ is provided with a slot E', through which the pin E² passes, the outer ends of the pin being secured in the weighted end of the valve-lever E³, pivoted at E⁴ within the valve-box B. The opposite end of this valve-lever E³ carries the valve E⁵, adapted to be swung upwardly and close the open end of the tube A', as shown in dotted lines, Fig. 3, when the lever D is moved to the left, as above described. This closing of the valve E⁵ is accomplished through the connections of the pin D', lever D³, arm D⁵, spring D⁸, and rod D⁹. As the lever D is moved to the left and before the roll E⁶ on the lever E comes into contact with the upper end of the rod F, the valve E⁵ is closed before the valve G begins to open. By the continued movement of the lever D the pin D' will pass over the cam-surface of the lever D³ without raising the rod D⁹ more than is sufficient to close the valve E⁵. After the lever D has moved to the position shown in dotted lines, Fig. 3, the collar F' on the rod F will engage with the catch F², pivoted at F³, and the valve G will be held open and air will pass from the supply-pipe G' through the valve-box B into the transmission-tube C and the carrier will be despatched to the opposite end of the line. Located around the transmission-tube C below the terminal is a ring C', having a passage C², connecting with the flange C³, to which is secured the diaphragm C⁴, held in place by the ring C⁵ and the screws C⁶. Resting on the outer side of the diaphragm C⁴ is a plate C', having the lugs C⁸, to which is pivoted the arm C⁹. This arm is pivoted near the opposite end at F⁴ to

the side of the valve-box B, and to the upper end of the arm C⁹ is pivoted the link F⁵, the opposite end being pivoted at F⁶ to the arm F⁷, secured to the shaft F³. The plate C⁷ is held in engagement with the diaphragm by the action of the spring F⁸, one end of which is in engagement with the lever C⁹, the opposite end being adjustable in the rack F⁹ to vary the tension of the spring F⁸.

With the arrangement of the diaphragm and lever as above described, when the air-pressure within the tube C is raised the action of the air on the diaphragm C⁴ through the connections of the lever C⁹, link F⁵, and arm F⁷ will release the catch F² from the collar F¹ on the valve-stem F, and the valve G will be allowed to close by the action of the spring F¹. At the opposite end of the line, Fig. 8, the terminal is identical in construction to that shown at the right-hand end, Fig. 8, and the carrier passing from the transmission-tube will pass upwardly through the tube C into the tube A' at the left-hand end and out through the opening A and around the chute H onto the receiving-table. As the carrier passes upwardly at the right hand of Fig. 8 through the tube A' it will engage with the finger D⁶, mounted on the lever D⁵, and the lever D⁵ will be raised, and through the connections of the spring D⁸ and rod D⁹ the valve E⁵ will be closed behind the carrier. As the valve G at the right-hand end has not yet been closed, the air-pressure within the transmission-tube C will be raised to the pressure within the supply-pipe G' and supply-tank G², into which air is forced by any suitable air-compressing apparatus and stored. This increased pressure within the transmission-tube C will act upon the diaphragm C⁴, and through the connections of the lever C⁹, link F⁵, and arm F⁷ the catch F² will be released from the collar F¹ on the valve-stem F, and the valve G at the left-hand end of the line will be allowed to close, thus shutting off the supply of air to the transmission-tube C.

Pivoted to the lugs J, mounted on the side of the valve-box B, as shown in Figs. 4 and 5, is a lever K, and mounted on the left-hand end of the lever K is a rod K', having on its opposite end the valve K², within the valve-box B and closing the opening K³ and held in the position shown in Fig. 5 by the action of the spring K⁴. On the opposite end of the arm K is a rod L, having a flange L' in engagement with the diaphragm L², secured to the side of the valve-box B and closing the opening L³. The opening L³ communicates with the chamber L⁴, and the opening K³ communicates with the chamber G² within the valve-box B. The tension of the spring K⁴ is so regulated that when the valve G is closed and the air-pressure within the chamber L⁴ is at its highest point the action of the pressure upon the diaphragm L² is sufficient to overcome the tension of the spring K⁴ and allow the valve K² to be opened; but when the valve G is open and air is passing from the

supply-pipe G' into the transmission-tube C the pressure upon the diaphragm L² will be reduced and the action of the spring K⁴ will depress the diaphragm and allow the valve K² to close, shutting off the opening K³. The object of this valve K² and diaphragm L² is to release the pressure within the despatch-tube C after the valve G is closed when the carrier is delivered at the opposite end of the line, and from the above description it will be seen that when the valve G is closed and the pressure within the chamber L⁴ rises and pushes out the diaphragm L² the valve K² will be pushed inwardly and allow the air within the transmission-tube C to escape through the opening K³. This opening will remain open until another carrier is despatched and the pressure within the chamber L⁴ reduced, when the action of the spring K⁴ will again close the opening K³, which will remain closed until the carrier is delivered at the opposite end of the line. The screw M is for the purpose of regulating the flow of air through the passage C² behind the diaphragm C⁴, so that the air will pass through the passage C² slowly, and any sudden increase of pressure in the tube caused by the starting or stopping of the carrier will not operate the diaphragm C⁴ sufficiently to release the catch F² and close the valve.

Having thus ascertained the nature of my invention and set forth a construction embodying the same, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for closing said inlet and said outlet, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, mechanism for operating the inlet-valve to close the inlet to the transmission-tube and for subsequently opening the air-inlet valve, mechanism in the path of the traveling carriers adapted to be operated thereby to close the valve at the outlet end of the tube after a carrier has passed said valve to cause an increase of pressure within the transmission-tube, means for holding said air-inlet valve open at the despatch end of the tube, and means operated by the increased pressure in the transmission-tube for actuating said air-inlet-valve-holding means for releasing the same and thereby permitting the closing of said air-inlet valve.

2. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for closing said inlet and said outlet, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, mechanism for operating the inlet-valve to close the inlet to the transmission-tube and for subsequently opening the air-inlet valve, mechanism in the path of the traveling carriers adapted to be oper-

ated thereby to close the valve at the outlet end of the tube after a carrier has passed said valve to cause an increase of pressure within the transmission-tube, means for holding said air-inlet valve open at the despatching end of the tube, and means operated by the increased pressure in the transmission-tube for actuating said air-inlet-valve-holding means for releasing the same and thereby permitting the closing of the air-inlet valve.

3. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for closing said inlet and said outlet respectively after the insertion and discharge of the carriers, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, a lever for operating the inlet-valve to close the inlet to the transmission-tube and for subsequently opening the air-inlet valve, mechanism in the path of the traveling carriers adapted to be operated thereby to close the valve at the outlet end of the tube after a carrier has passed said valve to cause an increase of pressure within the transmission-tube, a catch for holding said air-inlet valve open at the despatching end of the tube, a flexible diaphragm to which said catch is connected on one side and having its opposite side exposed to the pressure in the tube and adapted when actuated by the increased pressure in the tube to operate said catch and thereby release and permit the closing of the air-inlet valve.

4. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for said inlet and outlet, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, mechanism for operating the inlet-valve to close the inlet to the transmission-tube and for subsequently opening the air-inlet valve, mechanism connected to said valves controlling said inlet and outlet and adapted to allow the insertion of carriers at the inlet end without closing the valve and to be operated by the traveling carriers at the outlet end of the line to close the valve controlling said outlet to cause an increase of pressure within the transmission-tube, means for holding said air-inlet valve open at the despatching end of the tube, and means operated by the increased pressure in the transmission-tube for actuating said air-inlet-valve-holding means for releasing the same and thereby permitting the closing of said air-inlet valve.

5. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve located in the path of the compressed air from the air-inlet to the transmission-tube and adapted to be operated by mechanism to close the

inlet to the transmission-tube, a valve normally closing said air-inlet, mechanism for operating the inlet-valve to close the inlet to the transmission-tube and for subsequently opening the air-inlet valve, a valve for closing the outlet of the transmission-tube, mechanism in the path of the traveling carriers adapted to be operated thereby to close the valve at the outlet end of the tube after a carrier has passed said valve to cause an increase of pressure within the transmission-tube, means for holding said air-inlet valve open at the despatching end of the tube, and means operated by the increased pressure in the tube for actuating said air-inlet-valve-holding means for releasing the same and thereby permitting the closing of the air-inlet valve.

6. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for closing said inlet and said outlet, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, mechanism for closing the inlet to the transmission-tube and for opening the air-inlet valve, mechanism in the path of the traveling carriers adapted to be operated thereby to close said outlet-valve of the transmission-tube after a carrier has passed said valve, means for holding said air-inlet valve open at the despatching end of the transmission-tube, means for actuating said air-inlet-valve-holding means for releasing the same and thereby permitting the closing of said air-inlet valve, and means for releasing the air-pressure within the transmission-tube to allow the valves controlling the inlet and outlet of the transmission-tube to open.

7. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for closing said inlet and said outlet, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, mechanism for closing the inlet to the transmission-tube and for opening said air-inlet valve, mechanism in the path of the traveling carriers adapted to be operated thereby to close said outlet-valve of the transmission-tube after a carrier has passed said valve, means for holding said air-inlet valve open at the despatching end of the transmission-tube, means for actuating said air-inlet-valve-holding means for releasing the same and thereby permitting the closing of said air-inlet valve, and means consisting of a valve controlling an exhaust-opening in communication with the transmission-tube and operated by air-pressure from the source of compressed air to operate said valve to open the exhaust to allow the valves controlling the inlet and outlet of the transmission-tube to open.

8. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for clos-

ing said inlet and said outlet, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, mechanism for closing
 5 the inlet to the transmission-tube and for opening said air-inlet valve, mechanism in the path of the traveling carriers adapted to be operated thereby to close said outlet-valve of the transmission-tube after a carrier has
 10 passed said valve, means for holding said air-inlet valve open at the despatching end of the transmission-tube, means for actuating said air-inlet-valve-holding means for releasing the same and thereby permitting the closing
 15 of said air-inlet valve, means consisting of a valve controlling an exhaust-opening in communication with the transmission-tube and operated by air-pressure from the source of compressed air to operate said valve to
 20 open the exhaust to allow the valves controlling the inlet and outlet of the transmission-tube to open, and a spring for operating the valve controlling the exhaust to close said opening.
 25 9. In a pneumatic-despatch-tube apparatus, a carrier transmission-tube having an inlet and an outlet for the carriers, valves for clos-

ing said inlet and said outlet, a source of compressed air, an air-inlet for said compressed air to the transmission-tube, a valve normally closing said air-inlet, mechanism for opening
 30 said air-inlet valve, mechanism in the path of the traveling carriers adapted to be operated thereby to close said outlet-valve after the carrier has passed said valve, a catch for
 35 holding said air-inlet valve open at the despatching end of the transmission-tube, a flexible diaphragm to which said catch is connected on one side and having its opposite side exposed to the pressure in the transmission-tube and adapted when actuated by the
 40 pressure in said tube to operate said catch and thereby release and permit the closing of the air-inlet valve, and means for regulating the admission of air-pressure from the
 45 tube to the diaphragm.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 19th day of December, A. D. 1899.

JAMES T. COWLEY.

Witnesses:

A. L. MESSER,
 C. A. STEWART.